

For current pricing, please see our website.

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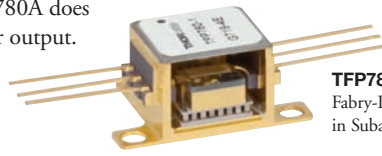
Fabry-Perot Lasers

Single Frequency Lasers

Optical Modulators

# Tunable Laser Gain Chips, Half-Butterfly Package (Page 1 of 2)

**Note:** The TFP780A does not include fiber output.



**TFP780A**  
Fabry-Perot Gain Chip in Subassembly

**NEW**  
products

## Features

- Center Wavelengths (ASE) from 780 to 1900 nm
- Designed for Broadband Tuning
- Gain Chips Mounted for Easy Integration into External Cavity Lasers
- Half-Butterfly Assembly with Thermoelectric Cooler
- AR Coating Eliminates Unwanted Reflections, Increasing Laser Stability, Output Power, and Spectral Quality

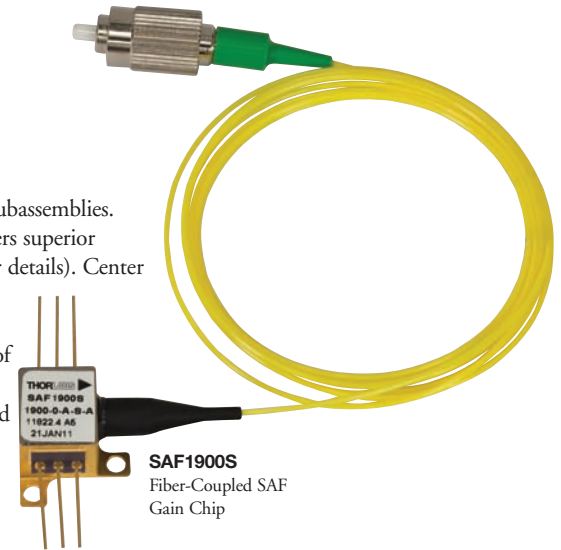
## Fabry-Perot Gain Chip

Thorlabs offers a 780 nm Fabry-Perot Gain Chip mounted in a half-butterfly package that includes a Thermoelectric Cooler (TEC) and thermistor. When used in our TLK-L780M external cavity laser kit (see page 1292), the TFP780A gain chip provides amplification for light in the 740 to 800 nm range. This chip is optimized for high gain, high power, and broad tunability (see the specifications table below for details).

## SAF Gain Chips

Thorlabs offers single-angled-facet (SAF) gain chips mounted in fiber-coupled subassemblies. With an extremely low effective AR coating ( $R_1 = 0.005\%$ ), the SAF design offers superior performance compared to traditional AR-coated laser diodes (see table below for details). Center wavelengths range from 780 to 1900 nm. Easily integrable into external cavity lasers (ECLs), these gain chips feature AR coatings, an angled waveguide, and a proven semiconductor optical amplifier (SOA) structure, which gives designers of ECLs the highest power and widest tuning range available on the market. All devices undergo a monitored burn-in procedure to ensure long-term stability and device quality.

To simplify integration of the gain chip into an external cavity design, Thorlabs offers an open butterfly package assembly, which couples the output of the normal facet to a fiber pigtail. The butterfly assembly includes the gain chip mounted on a thermoelectric cooler such that the gain chip's normal facet is pre-aligned with a collimating lens. By using the assembly, the designer gains the advantage of a fiber-coupled ECL cavity. An optical isolator, which is incorporated in the SAF1174, SAF1175, and SAF1176 series gain chips, prevents any unwanted reflections from disrupting ECL operation.



**SAF1900S**  
Fiber-Coupled SAF Gain Chip

**Note:** Our stocked SAF gain chips are coupled to either SM or PM fiber, depending on wavelength (see table below for details). We can provide other fiber types upon request. Please contact Technical Support for details.

## Optical-Electrical Characteristics

ITEM #	REFERENCE CAVITY	CWL <sup>c</sup>	TUNING RANGE <sup>c, d</sup>	PEAK POWER <sup>e</sup>	ASE CWL	GAIN <sup>e</sup>	R <sub>1</sub>	R <sub>2</sub>	CHIP LENGTH	EXIT ANGLE
TFP780A	TLK-L780M <sup>a</sup>	770 nm	30 nm	50 mW	780 nm	–	0.01%	90% <sup>f</sup>	0.75 mm	0°
SAF780P	TLK-L780M2 <sup>a</sup>	770 nm	30 nm	25 mW	780 nm	20 dB	0.005%	10% <sup>g</sup>	1.5 mm	26.5°
SAF850P	TLK-L850M <sup>a</sup>	850 nm	30 nm	10 mW	850 nm	20 dB	0.005%	10% <sup>g</sup>	1.5 mm	
SAF1171S	TLK-L1050M <sup>a</sup>	1050 nm	60 nm	8 mW	1060 nm	30 dB	0.005%	10% <sup>g</sup>	1 mm	
SAF1175S	TLK-L1220R <sup>b</sup>	1220 nm	90 nm	40 mW	1220 nm	17 dB	0.005%	10% <sup>g</sup>	1 mm	
SAF1174S	TLK-L1300R <sup>b</sup>	1310 nm	130 nm	70 mW	1320 nm	35 dB	0.005%	10% <sup>g</sup>	2 mm	
SAF1093S	OEM	1450 nm	110 nm	25 mW	1450 nm	20 dB	0.005%	10% <sup>g</sup>	1.5 mm	
SAF1176S	TLK-L1550R <sup>b</sup>	1550 nm	120 nm	30 mW	1550 nm	17 dB	0.005%	10% <sup>g</sup>	1 mm	19.5°
SAF1176P-30	TLK-L1550R <sup>b</sup>	1550 nm	130 nm	10 mW	1550 nm	17 dB	0.005%	30% <sup>g</sup>	1 mm	
SAF1091S	OEM	1650 nm	110 nm	10 mW	1650 nm	15 dB	0.005%	10% <sup>g</sup>	1.5 mm	26.5°
SAF1900S	TLK-L1900M <sup>a</sup>	1900 nm	170 nm	10 mW	1900 nm	18 dB	0.005%	20% <sup>g</sup>	2 mm	

<sup>a</sup> Littman Configuration

<sup>b</sup> Littrow Configuration

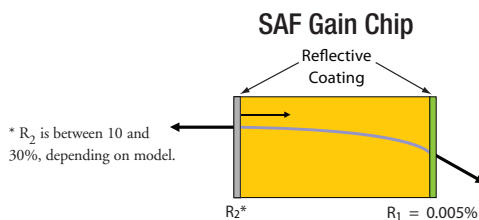
<sup>c</sup> Different external cavities will produce different performance specifications. The data given here is only valid for the specified reference cavity.

<sup>d</sup> 10 dB point

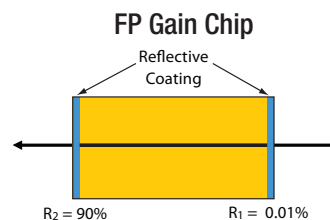
<sup>e</sup> Single pass optical gain at center of gain curve

<sup>f</sup> FP chip reflectivity diagram (see below)

<sup>g</sup> SAF chip reflectivity diagram (see below)

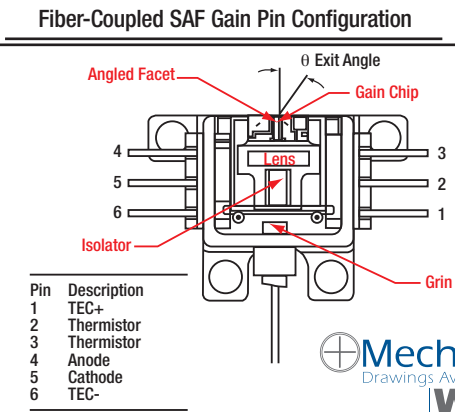
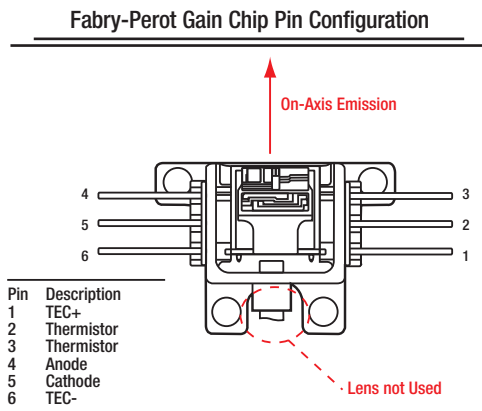
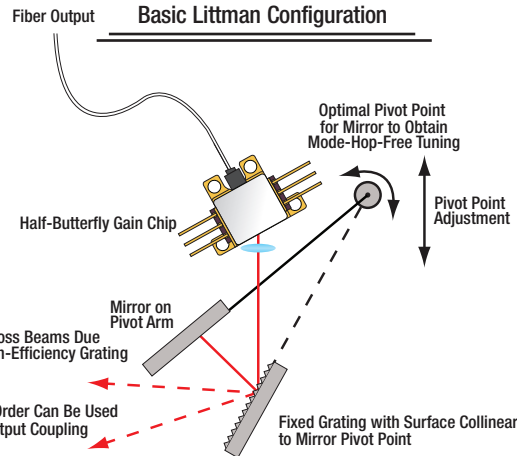
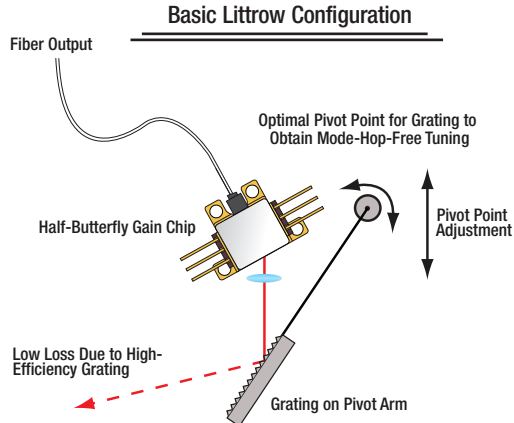


\* R<sub>2</sub> is between 10 and 30%, depending on model.



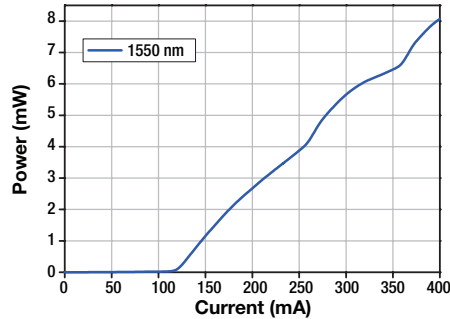
Please see our website for a comprehensive list of performance specifications and plots.

# Tunable Laser Gain Chips, Half-Butterfly Package (Page 2 of 2)

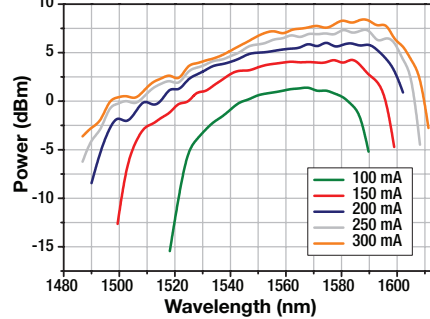


## Typical Gain Chip Lasing Performance Using Tunable Laser Kit\*

Output Power: SAF1176P-30  
Littrow Cavity: TLK-L1550R



Power Spectrum: SAF1176P-30  
Littman Cavity: TLK-L1550M



\* Model-specific information is available on our website.

## Fabry-Perot Gain Chip

ITEM #	\$	£	€	RMB	DESCRIPTION
TFP780A	\$ 2,200.00	£ 1,584.00	€ 1,914.00	¥ 17,534.00	Mounted Fabry-Perot Gain Chip, ASE CWL = 780 nm, Free-Space Output

## SAF Gain Chips

ITEM #	\$	£	€	RMB	DESCRIPTION
SAF780P	\$ 2,500.00	£ 1,800.00	€ 2,175.00	¥ 19,925.00	Mounted SAF Gain Chip, ASE CWL = 780 nm, Gain = 20 dB, PM Fiber
SAF850P	\$ 2,500.00	£ 1,800.00	€ 2,175.00	¥ 19,925.00	Mounted SAF Gain Chip, ASE CWL = 850 nm, Gain = 20 dB, PM Fiber
SAF1171S	\$ 3,000.00	£ 2,160.00	€ 2,610.00	¥ 23,910.00	Mounted SAF Gain Chip, ASE CWL = 1060 nm, Gain = 30 dB, SM Fiber
SAF1175S	\$ 2,500.00	£ 1,800.00	€ 2,175.00	¥ 19,925.00	Mounted SAF Gain Chip, ASE CWL = 1220 nm, Gain = 17 dB, SM Fiber
SAF1174S	\$ 2,500.00	£ 1,800.00	€ 2,175.00	¥ 19,925.00	Mounted SAF Gain Chip, ASE CWL = 1320 nm, Gain = 35 dB, SM Fiber
SAF1093S	\$ 2,600.00	£ 1,872.00	€ 2,262.00	¥ 20,722.00	Mounted SAF Gain Chip, ASE CWL = 1450 nm, Gain = 20 dB, SM Fiber
SAF1176S	\$ 2,500.00	£ 1,800.00	€ 2,175.00	¥ 19,925.00	Mounted SAF Gain Chip, ASE CWL = 1550 nm, Gain = 17 dB, SM Fiber
SAF1176P-30	\$ 3,000.00	£ 2,160.00	€ 2,610.00	¥ 23,910.00	Mounted SAF Gain Chip, ASE CWL = 1550 nm, Gain = 17 dB, PM Fiber
SAF1091S	\$ 2,700.00	£ 1,944.00	€ 2,349.00	¥ 21,519.00	Mounted SAF Gain Chip, ASE CWL = 1650 nm, Gain = 15 dB, SM Fiber
SAF1900S	\$ 2,500.00	£ 1,800.00	€ 2,175.00	¥ 19,925.00	Mounted SAF Gain Chip, ASE CWL = 1900 nm, Gain = 18 dB, SM Fiber